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SOIL AND WATER CONSERVATION IN MOAPA VALLEY, NEVADA
(An Extension Case History*)

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Farmers in the Moapa Valley in souther Nevada have been battling for sixty years the forces of nature that are concentrated in an unusual manner in this oasis in a desert region. They are winning, through the leadership and management of the Moapa Valley Soil Conservation District Supervisors, the cooperation of other agencies and organizations, and the energetic work of determined farmers.

Major Features of the Valley

The Moapa Valley is located on the edge of the Mojave Desert in southern Nevada. It has a typical desert climate with scant rainfall, very little snow, high wind velocity, and a high rate of evaporation. The area has a long growing season averaging 234 days, where water is available for irrigation.

The valley has a variety of land conditions including level bottom land, level table land with rolling to choppy breaks, and gently sloping alluvial fans. It is bordered by rolling hills and rugged mountains.

The total area of the valley land is about 10,000 acres. About 4,000 acres of this land has been irrigated. Lake Meade, the reservoir formed by the Boulder Dam on the Colorado River, has inundated about 1,000 acres of farm land in lower Moapa Valley. There is sufficient good land remaining to fully utilize all the available water supply.

The principal stream is Muddy River which originates in a series of springs and flows east and south to Lake Meade. The springs have a very steady flow which provides a dependable water supply for irrigation. The water is not of the best quality for either domestic or irrigation use, but when the lands to be irrigated are provided with adequate drainage, the water can be used without harm to the soil.

The long growing season and a constant supply of irrigation water provide for growing a wide variety of crops. The more important crops are alfalfa, barley, wheat, and truck crops. The land in Moapa Valley is very productive and capable of intensive use.

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The People Past and Present

When the first white explorers and settlers reached the area they found it occupied by poverty-stricken Indians who were farming in a crude way. These Indians grew corn, beans, melons, pumpkins, and squash on very small isolated tracts of land. The valley still has small areas allotted to the Indians.

The first modern settlements were made in 1864 by Mormon pioneers who thought it was a part of Utah. When the Utah-Nevada State line was established in 1871, Nevada included Moapa Valley and the farmers abandoned their lands and returned to Utah largely because of resulting tax problems. The area was again settled by Mormons in 1883.

The early settlers, isolated by the lack of transportation facilities, practiced diversified farming. Commercial agriculture had its beginning with the construction of the railroad in 1905. The availability of outside markets soon induced the practice of double cropping the land by growing a winter and spring truck crop such as tomato plants, radishes, green onions, and lettuce followed in the summer and fall by corn, milo maize, or hegari. The valley is now well provided with railroads, highways, truck and bus lines, electric power, and telephones. Portable water for domestic use has always been a problem. Some drinking water is brought by railroad from Las Vegas, 50 miles away, and some is obtained from wells. Water from the river is carried by a high line canal to most of the buildings in lower Moapa Valley but this is of poor quality for drinking purposes.

The educational system includes three elementary schools and a high school. There are three Mormon churches. The population is principally of the Latter Day Saints' belief, which promotes a close relationship between educational, religious, social, and economic activities, thus bringing a concentration of the interest and energy of local people in solving their problems. The church in its central organization and through regional committees, "stake" committees, and ward committees seeks to furnish educational, social, and economic advantages to its membership. The advantages are dependent largely on merit and on the initiative of local churches. The home and the community and the land on which they depend are more appreciated by these people than in most communities. The people have a fixed community pattern, active community organizations, and experienced local leaders who can be readily assigned to new duties and be informed for carrying them out. The valley has an active Farm Bureau, rural women's organizations, and 4-H Clubs.

Soil and Water Conservation Problems

Devasting floods, recurring every few years with increasing volume with erosion and silting, and the high water table in the valley have made a concerted effort necessary to save and maintain the farm lands. Damage to

farm land is also caused by poor methods of irrigation, by poorly prepared lands, and from gullying by waste water where it flows into the drainage channels. The erosion along the main drainage channel has been extremely serious, threatening to destroy a considerable part of the good agricultural land in the valley.

The native cover of public-owned ranges outside the valley has been depleted in many places by overgrazing. Sheet erosion has been widespread, and there is also much gully erosion. The conservation of the public-owned land is necessary to facilitate the control of floods, silting, stream bank erosion, and gullying and silting on the irrigated lands of the valley.

The residents of Moapa Valley have been fighting a continuous battle against a high water table on the low valley lands and a detrimental concentration of alkali in the top soil ever since modern agriculture was introduced in the area. Better leveling of land and better farm irrigation systems and a system of drainage for the valley are needed to help solve these problems. On the range lands grazing control, flood water diversion and spreading, and construction of large dams for water storage and flood control are important in the conservation program.

Agricultural Education Before 1937.

From 1905 to 1916 an experiment farm located in lower Moapa Valley helped farmers of the valley with many of their farming problems. Since 1917 Clark County has employed both a county agricultural agent and home agent continuously except for brief periods. Soil and water conservation were given attention by the experiment farm. The county Extension organization included flood control, soil improvement, and irrigation and water supply improvement early in its program, and these problems have been followed continuously by the same county agent since 1921. Even in the depression years the problems of greatest importance currently were recognized as transitory and the problems of soil and water conservation received major emphasis because "depleted soil signifies depleted citizenship." Year by year advantage was taken by local people of resources available for erosion control, flood control, drainage, and the associated problems. The county agent was active in assembling and supplying information and in obtaining and planning for the use of these resources. But the threats of floods, erosion, soil depletion and alkali hung heavily over farmers in the valley.

Moapa Valley Soil Conservation District Organized

Early in 1937 the State Legislature in Nevada passed the State Soil Conservation Districts Law authorizing landowners to form legal State subdivisions to carry out soil and water conservation programs and to cooperate with Federal, State, and local agencies, organizations, and individuals in conservation work. The county agent of Clark County explained the functions of a soil conservation district and the steps to be taken in establishing such a district at meetings of the County Land Use Planning Committee and

the County Farm Bureau. Farm Bureau and planning committeemen explained these in Farm Bureau meetings in Moapa Valley and to various other organizations. It seemed to leaders that with a soil conservation district they could better solve their soil and water conservation problems. Through aggressive education, including newspaper articles, meetings, and discussions conducted among farmers, people were generally informed regarding the proposed district. Before the end of the year the Moapa Valley Soil Conservation District was created and ready for work. According to the State Law two supervisors were appointed by the State Committee and three were elected by landowners and operators in the district. The county Extension agent was elected secretary of the District Board of Supervisors.

The District Plans for Work

The district supervisors with the cooperation of local people, organizations, and agencies prepared a program and work plan for the district. Farmer committees were appointed to outline the problems and how they could be solved, and the county agent and other agency representatives worked with these committees.After considering the program and work plan of the district the Soil Conservation Service of the Department of Agriculture arranged to furnish technical and other assistance to the district. Various other agencies of the Federal, State, and local governments provided assistance informally in connection with the management of their own work which in many cases is concerned with land management and protection of life, public resources, and private property.

The plans for solving the many problems in the Moapa Valley include two types of work. One is construction work which provides protection or benefits to the valley as a whole or to groups of farms, such as, flood control structures, river bank protection, drainage, improvement of the irrigation system, and work on the watershed lands to control floods. A study is being made of the entire irrigation system of the valley to determine where and how the system can be improved. The other type of work is on the individual farms. This includes a careful study of the land, its soil, slope, extent of erosion, past use, and conditions which determine its capability for various uses. Based on these studies plans are made for the best use of the land for permanent production of crops, pasture, or meadow or permanent grass or trees and for the care of the land in each use. These plans provide for such work as leveling the land for irrigation, adjusting the irrigation structures for efficient management of irrigation water, and cropping plans. When an individual farm plan is completed it forms the basis for an agreement between the district supervisors and the farmer for efficient use and management of the land for its permanent protection.

Technical assistance provided to the district supervisors by the Soil Conservation Service was used for planning its construction work and various other agencies have helped in the planning and in different construction jobs. Technical services have also been provided to the district supervisors for helping individual farmers with farm plans. Detailed surveys

have been published for use of district supervisors, farmers, and the cooperating agencies. Many surveys for the construction jobs have also been completed. These are of basic importance in planning for district work. Investigations are under way considering the practicability of piping water for domestic uses from Lake Meade which now extends into the lower part of Moapa Valley.

Education Leads the Way

Educational activities have been carried on by the Extension Service and the SCS personnel in various meetings and by direct contact with individual farmers in which farm and community problems have been discussed. The district supervisors have also been very influential in matters pertaining to promotion of action programs among farmers of the area. The county Extension agent has devoted from 49 to 133 days per year to problems of land use, soil and water conservation, and flood control, cooperating with the Moapa Valley Soil Conservation District and with the many agencies concerned with these problems. Much Extension specialist assistance was also provided to the district.

Progress in District Work

Because of the availability of labor and equipment some of the larger construction problems were first attacked. Through the cooperation of the Soil Conservation Service and the Moapa Valley Irrigation District with the Moapa Valley Soil Conservation District, new headgates were installed and an improved system for water distribution was developed. Drainage systems were planned and in 1940 the drainage system for the upper valley was completed. Farmers report the water table was lowered two to three feet after this drainage. The crops are more thrifty and yield more than in previous years. More than fifty miles of flood control dykes and drainage channels have been planned and much construction work has been done. Many miles of irrigation ditches and farm land drainage ditches have been constructed. Since the benefits of drainage have been demonstrated, the farmers are more conscious of the insidious nature of soil depletion caused by alkali and the high water table that was attacking the farm land of the valley and realize that an adjustment in irrigation practices is necessary.

Farmers have applied crop rotations and systematic fertilizing. Much land clearing has been completed and the land prepared for irrigation. Leveling has been done and improved methods of irrigation have been applied. Much land has been flooded to leach out the alkali. Areas damaged by gullies and sheet erosion have been planted to trees and shrubs.

By the end of 1943 all but one of the farms were planned and put under farmer-district agreements. Early in 1944 the chairman of the district governing body related this progress with a great deal of pride and said that the governing body would soon have an agreement with this last farmer in the valley.

Local voluntary leaders devoted 36 to 106 days per year to helping with the soil and water programs. District supervisors' meetings were held to discuss problems and clarify the work of local leaders and the procedures in carrying out the operational program with the Irrigation Company and discuss problems which arise.

The 1943 annual report of the district governing body shows that during the year twenty-one meetings, including two tours, were held which directly or indirectly concerned the district program. Educational meetings were held for the purpose of disseminating information as to proper soil treatment and the use of fertilizer and organic matter in increasing the productiveness of the land. An educational film in color and with sound was used in promoting this program. A great deal of favorable comment was received in regard to the information presented. As one farmer put it, "I should see the film at least three times and then stop and discuss it as we go along; then I could get what I think I should out of it." Tours were conducted for the prupose of reviewing flood control problems originating on the forest and grazing lands to stimulate an active program on these lands.

The work being carried on at the present time is of great interest to the Muddy Valley Irrigation Company as well as the Moapa Valley Soil Conservation District, and the Irrigation Company is helping to finance much of the construction work. Much of the irrigating is done at present with long runs. The farmer turns the water on the land and leaves it running for several hours while he is working elsewhere. This method is wasteful of water and is probably a major factor in increasing the alkali in the top soil on the farms in the lower part of the valley. Under the program that the Irrigation Company and the Soil Conservation District are promoting the farmer is asked to cut his field irrigation distances down and have a man present at all times to do the irrigating. It is hoped that this ideal may soon be achieved. The chairman of the Moapa Valley District supervisors is also president of the Muddy Valley Irrigation Company. He devotes much of his time to promoting a valley-wide program which benefits the farmers individually and as a group.

He says that farmers are in the best position they have ever been in to meet the soil and water conservation problems, but in spite of the tremendous progress in soil and water conservation in the Moapa Valley District there is a great deal of additional work needed. He further states that there will always be improvements that can be made in the farm lands and water management for more efficient use of the land and water resources that will mean important work for the Moapa Valley Soil Conservation District. He says the supervisors have decided that the best way to make sure of permanent soil maintenance and land protection is to train the children. Through the efforts of the supervisors and other leaders, the interest of school teachers, parents, and children has been developed. In cooperation with the county Extension agent the activities of the 4-H Club have been enlivened and redirected to include more training in soil and water conservation.

Factors Favorable to Progress

1. The people are isolated from other areas and located in a small area with a common interest in the problems.

2. The people are united by kinship and membership in the same religious group, as well as by civic and economic interests.

3. The subsistence of the people depends greatly on soil and water conservation.

4. Many agencies have an interest in soil and water conservation problems in the valley.

5. Farmers' organizations have actively helped with the program.

6. The work of the soil conservation district is closely correlated with that of the Irrigation Company.

7. The same county agent has served with a concentrated interest in the soil and water conservation program continuously for 23 years.

8. The climate is suitable for intensive cropping.

9. Transportation to markets and the availability of electric power are valuable assets.

10. Technical assistance and other resources available from agencies to the soil conservation district are helping solve the problems.

Factors that Limit Progress

1. Much of the solution of the problem requires extensive construction and a great deal of funds and resources.

2. Floods originate on areas not in control of local people.

3. Solving the problem on individual farms requires much technical information and training.

4. Lack of potable water is a handicap.

5. The amount of water for irrigation limits expansion of the farming area.

Major problems are evident and are generally recognized. Much progress has been made and there is a clearer understanding of the needs. Continued presistent work of local people, an aggressive educational program, and full cooperation of all concerned will bring continued progress.